What is claimed is:

1. An RF ID card reader, comprising:

RF ID circuitry to generate an RF ID signal;

a transceiver in communication with said RF ID circuitry; and

a scanning antenna associated with said transceiver for scanning an area for at least one tag and establishing communication with at least one tag.

2. The RF ID card reader of claim 1, wherein said scanning antenna comprises:

at least one RF module, said at least one RF module further comprising at least one RF connection for receipt of at least one RF signal and at least one tunable or switchable device;

a RF motherboard for acceptance of RF signals and distribution of the transmit energy to said RF module at the appropriate phases to generate a beam in the commanded direction and width; and

a controller for determining the correct signal to send to said at least one RF module.

3. The RF ID card reader of claim 2, wherein said at least one RF signal has either single or dual polarization which can be either linear or circular.

4. The RF ID card reader of claim 2, wherein said at least one RF module is nine RF modules.

5. The RF ID card reader of claim 1, wherein an interface connects said scanning antenna with a microcontroller associated with said reader.

6. The RF ID card reader of claim 2, wherein said beam width and steer have at least a 6 dBi gain throughout a 360 degree azimuth scan or any segmentation of 360 degrees.

7. The RF ID card reader of claim 2, further comprising a Radome surrounding said at least one RF module and said RF mother board.

8. The RF ID card reader of claim 2, further comprising a base attached to said radome housing said controller, said base provides openings for reception of an RF connector, power supply and data input.

9. The RF ID card reader of claim 2, wherein said scanning antenna operation is in any one, all or part of the following frequencies: the 2.4 GHz band; the 5.1 to 5.8 GHz band; the 860-960MHz band; or the 433MHz band.

10. The RF ID card reader of claim 2, further comprising a software driver to control said scanning antenna azimuth scan angle to maximize a received wireless signal.

11. The RF ID card reader of claim 2, further comprising a three way divider, the output of said power divider connects to a phase shifter module.

12. An RF ID tag system, comprising:

at least one RF ID tag;

at least one RF ID tag reader, said at least one tag reader including at least one RF ID tag reader microcontroller; and

at least one transceiver associated with said at least one microcontroller, said at least one transceiver in communication with at least one scanning antenna for transmitting signals to and receiving signals from said at least one tag.

13. The RF ID tag system of claim 12, wherein said at least one scanning antenna comprises:

at least one RF module, said at least one RF module further comprising at least one RF connection for receipt of at least one RF signal and at least on tunable or switchable device;

an RF motherboard for acceptance of RF signals and distribution of the transmit energy to said RF module at the appropriate phases to generate a beam in the commanded direction and width; and

a controller for determining the correct signal to send to said at least one RF module.

15. The RF ID card reader of claim 14, wherein said at least one RF signal has either single or dual polarization which can be either linear or circular.

16. The RF ID card reader of claim 14, wherein said at least one RF module is nine RF modules.

17. The RF ID card reader of claim 13, wherein an interface connects said scanning antenna with a microcontroller associated with said reader.

18. The RF ID card reader of claim 14, wherein said beam width and steer have at least a 6 dBi gain throughout a 360 degree azimuth scan or any segmentation of 360 with at least 6dBi gain..

19. The RF ID card reader of claim 14, further comprising a Radome surrounding said at least one RF module and said RF mother board.

20. The RF ID card reader of claim 14, further comprising a base attached to said radome housing said controller, said base provides openings for reception of an RF connector, power supply and data input.

21. The RF ID card reader of claim 14, wherein said scanning antenna operation is in any one, all or part of the following frequencies: the 2.4 GHz band; the 5.1 to 5.8 GHz band; the 860-960MHz band; or the 433MHz band.

22. The RF ID card reader of claim 14, further comprising a software driver to control the said scanning antenna azimuth scan angle to maximize a received wireless signal.

23. The RF ID card reader of claim 2, further comprising a three way divider, the output of said power divider connects to a phase shifter module.

24. A method of tracking an object, person or thing, comprising the steps of:

associating an RF ID tag with said object, person or thing;

providing an RF ID tag reader with a scanning antenna for transmitting information to, and receiving information from, said RF ID tag, said RF ID tag containing information about said object, person or thing.

25. The method of tracking an object, person or thing of claim 24, wherein said scanning antenna comprises:

at least one RF module, said at least one RF module further comprising at least one RF connection for receipt of at least one RF signal and at least one tunable or switchable device.

an RF motherboard for acceptance of RF signals and distribution of the transmit energy to said RF module at the appropriate phases to generate a beam in the commanded direction and width; and

a controller for determining the correct signal to send to said at least one RF module.

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~~26~~ 25. The method of tracking an object, person or thing of claim ~~25~~ 24, wherein said at least one RF signal is at least two RF signal has either single or dual polarization which can be either linear or circular.

~~27~~ 26. The method of tracking an object, person or thing of claim ~~25~~ 24, wherein said at least one RF module is nine RF modules.

~~28~~ 27. The method of tracking an object, person or thing of claim ~~24~~ 23, wherein an interface connects said scanning antenna with a microcontroller associated with said reader.

~~29~~ 28. The method of tracking an object, person or thing of claim ~~25~~ 24, wherein said beam width and steer have at least a 6 dBi gain throughout a 360 degree azimuth scan or any segmentation of 360 degrees with at least 6dBi gain..

30. The method of tracking an object, person or thing of claim 25, wherein said scanning further comprises a Radome surrounding said at least one RF module and said RF mother board.

31. The method of tracking an object, person or thing of claim 25, wherein said scanning antenna further comprises a base attached to said radome housing said controller, said base provides openings for reception of an RF connector, power supply and data input.

32. The method of tracking an object, person or thing of claim 25, wherein said scanning antenna operation is in any one, all or part of the following frequencies: the 2.4 GHz band; the 5.1 to 5.8 GHz band; the 860-960MHz band; or the 433MHz band.

33. The method of tracking an object, person or thing of claim 25, wherein said scanning antenna further comprises a software driver to control said scanning antenna azimuth scan angle to maximize a received wireless signal.

34. The method of tracking an object, person or thing of claim 25, wherein said scanning antenna further comprises a three way divider, the output of said power divider connects to a phase shifter module.

35. An RF ID card reader, comprising:

RF ID circuitry to generate an RF ID signal;

a transceiver in communication with said RF ID circuitry; and

an array antenna associated with said transceiver for scanning an area for at least one tag and establishing communication with at least one tag.

~~36~~ 35. The RF ID card reader of claim ~~35~~ 34, wherein said array antenna comprises:

a radiating antenna element;

at least one parasitic antenna element;

at least one voltage-tunable capacitor connected to said at least one parasitic antenna element; and

a controller for applying a voltage to each voltage-tunable capacitor to change the capacitance of each voltage-tunable capacitor and thus control the directions of maximum radiation beams and minimum radiation beams of a radio signal emitted from said radiating antenna element and said at least one parasitic antenna element.

~~37~~ 36. The RF ID card reader of claim ~~36~~ 35, wherein each voltage-tunable capacitor includes a tunable ferroelectric layer and a pair of metal electrodes separated by a predetermined distance and located on top of the ferroelectric layer.

~~38~~ 37. The RF ID card reader of claim ~~36~~ 35, wherein each parasitic antenna element is arranged a predetermined distance from said radiating antenna element.

39. The RF ID card reader of claim 36, wherein said radiating antenna element and said at least one parasitic antenna element are separated from one another by about 0.2λ0-0.5λ0 where λ0 is a working free space wavelength of the radio signal.

40. The RF ID card reader of claim 36, wherein said radiating antenna element and said at least one parasitic antenna element each have one of the following configurations:

a monopole antenna;

a dipole antenna;

a planar microstrip antenna;

a patch antenna;

a ring antenna; or

a helix antenna.

41. The RF ID card reader of claim 36, wherein said minimum radiation beams are nulls and said maximum radiation beams are 360 degree steerable radiation beams.

42. The RF ID card reader of claim 36, wherein:

said radiating antenna element is a dual band radiating antenna element; and

said at least one parasitic antenna element includes at least one low frequency parasitic antenna element and at least one high frequency parasitic antenna.

43. The RF ID card reader of claim 35, wherein said array antenna comprises:

a radiating antenna element excited by radio frequency energy of a radio signal;

at least one parasitic antenna element;

at least one voltage-tunable capacitor connected to said at least one parasitic antenna element;

each parasitic antenna element receives the radio frequency energy of the radio signal emitted from said radiating antenna element and then re-radiates the radio frequency energy of the radio signal after the radio frequency energy has been reflected and phase changed by each voltage-tunable capacitor; and

a controller that phase changes the radio frequency energy at each parasitic antenna element by applying a voltage to each voltage-tunable capacitor to change the capacitance of each voltage-tunable capacitor and thus enables the steering of the radiation beams and nulls of the radio signal emitted from said radiating antenna element and said at least one parasitic antenna element.

44. The RF ID card reader of claim 43, wherein each voltage-tunable capacitor includes a tunable ferroelectric layer and a pair of metal electrodes

separated by a predetermined distance and located on top of the ferroelectric layer.

44. The array antenna of Claim 42, wherein said at least one parasitic antenna element is arranged on a circumference of a predetermined circle around said radiating antenna element.

45. The array antenna of Claim 42, wherein said radiating antenna element and said at least one parasitic antenna element are separated from one another by about 0.2λ0-0.5λ0 where λ0 is a working free space wavelength of the radio signal.

46. The array antenna of Claim 42, wherein said radiating antenna element and said at least one parasitic antenna element each have one of the following configurations:

a monopole antenna;

a dipole antenna;

a planar microstrip antenna;

a patch antenna;

a ring antenna; or

a helix antenna.

47. The array antenna of Claim 42, wherein:

said radiating antenna element is a dual band radiating antenna element; and

said at least one parasitic antenna element includes at least one low frequency parasitic antenna element and at least one high frequency parasitic antenna.

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~~49~~ 48. An RF ID card reader, comprising:

RF ID circuitry to generate an RF ID signal;

a transceiver in communication with said RF ID circuitry; and

a switched polarization antenna associated with said transceiver for communication with at least one tag.

~~50~~ 49. The RF ID card reader of claim ~~49~~ 48, wherein said switched polarization antenna is a switched polarization scanning antenna for scanning an area for at least one tag and establishing communication with at least one tag..

~~51~~ 50. The RF ID card reader of claim ~~49~~ 48, wherein said polarization antenna provides a plurality of RF signals, at least one RF signal with Vertical polarization and at least one RF signal with Horizontal polarization.

~~52~~ 51. The RF ID card reader of claim ~~49~~ 48, wherein said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization will pass through at least one single pole double throw switch, said at least one

single pole double throw switch capable of outputting said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization to a hybrid coupler, or which passes said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization with the same polarization.

rule 1.10

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53. The RF ID card reader of claim 50, wherein said hybrid coupler converts vertical / horizontal polarizations into two slant polarizations at +45 ° and –45°.

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54. The RF ID card reader of claim 50, further comprising at least one switch for receiving at least one RF signal from said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization, said at least one switch selecting the desired set of polarizations, namely Vertical/Horizontal or + 45 ° and –45 ° slant.

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55. A method of tracking an object, person or thing, comprising the steps of:

associating an RF ID tag with said object, person or thing;

providing an RF ID tag reader with a switched polarization antenna for transmitting information to, and receiving information from, said RF ID tag, said RF ID tag containing information about said object, person or thing.

55 54
56. The method of tracking an object, person or thing of claim 55, wherein said switched polarization antenna is a switched polarization scanning antenna for

scanning an area for at least one tag and establishing communication with at least one tag.

56 54
57. The method of tracking an object, person or thing of claim 55, wherein said polarization antenna provides a plurality of RF signals, at least one RF signal with Vertical polarization and at least one RF signal with Horizontal polarization.

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57 54
58. The method of tracking an object, person or thing of claim 56, wherein said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization will pass through at least one single pole double throw switch, said at least one single pole double throw switch capable of outputting said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization to a hybrid coupler, or which passes said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization with the same polarization.

58 54
59. The method of tracking an object, person or thing of claim 58, wherein said hybrid coupler converts vertical / horizontal polarizations into two slant polarizations at +45 ° and –45°.

59 54
60. The method of tracking an object, person or thing of claim 55, further comprising at least one switch for receiving at least one RF signal from said at least one RF signal with horizontal polarization and at least one RF signal with

vertical polarization, said at least one switch selecting the desired set of polarizations, namely Vertical/Horizontal or + 45 ° and –45 ° slant.

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61. An RF ID tag system, comprising:

at least one RF ID tag;

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at least one RF ID tag reader, said at least one tag reader including at least one RF ID tag reader microcontroller; and

at least one transceiver associated with said at least one microcontroller, said at least one transceiver in communication with at least one switched polarization antenna for transmitting signals to and receiving signals from said at least one tag.

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62. The RF ID tag system of claim 61, wherein said switched polarization antenna is a switched polarization scanning antenna for scanning an area for at least one tag and establishing communication with at least one tag..

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63. The RF ID tag system of claim 61, wherein said switched polarization antenna provides a plurality of RF signals, at least one RF signal with Vertical polarization and at least one RF signal with Horizontal polarization.

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64. The RF ID tag system of claim 61, wherein said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization will pass through at least one single pole double throw switch, said at least one

single pole double throw switch capable of outputting said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization to a hybrid coupler, or which passes said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization with the same polarization.

64. The RF ID tag system of claim 60, wherein said hybrid coupler converts vertical / horizontal polarizations into two slant polarizations at +45 ° and –45°.

65. The RF ID tag system of claim 60, further comprising at least one switch for receiving at least one RF signal from said at least one RF signal with horizontal polarization and at least one RF signal with vertical polarization, said at least one switch selecting the desired set of polarizations, namely Vertical/Horizontal or + 45 ° and –45 ° slant.

66. A method of locating the position of an object, person or thing, comprising the steps of:

associating at least one RF ID tag with said object, person or thing;

establishing communication between at least one RF ID tag reader and said at least one RF ID tag, said at least one RF ID tag reader including at least two electronically steerable scanning antennas; and

determining the location of said at least one RF ID tag relative to said at least one RF ID tag reader by triangulating the angular information between said

at least one RF ID tag and said at least two electronically steerable scanning antennas associated with said at least one RF ID tag reader.

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68. The method of locating the position of an object, person or thing of claim 66, further comprising determining the signal strength of the communication between said at least one RF ID tag and said at least one RF ID tag reader to improve accuracy of said position information.

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69. The method of locating the position of an object, person or thing of claim 66, further comprising determining the time of flight of RF signals between said at least one RF ID tag and said at least one RF ID tag reader to improve accuracy of said position information.

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70. A method of locating the position of an object, person or thing, comprising the steps of:

associating at least one RF ID tag with said object, person or thing;

establishing communication between at least two RF ID tag readers and said at least one RF ID tag, said at least two RF ID tag readers including at least one electronically steerable scanning antenna; and

determining the location of said at least one RF ID tag relative to said at least two RF ID tag readers by triangulating the angular information between said at least one RF ID tag and said at least two RF ID tag reader using said at least one electronically steerable scanning antennas.

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71. The method of locating the position of an object, person or thing of claim 69, further comprising determining the signal strength of the communication between said at least one RF ID tag and said at least two RF ID tag readers to improve accuracy of said position information.

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72. The method of locating the position of an object, person or thing of claim 69, further comprising determining the time of flight of RF signals between said at least one RF ID tag and said at least two RF ID tag readers to improve accuracy of said position information.

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73. An object, person or thing position determination system, comprising:

at least one RF ID tag associated with said object, person or thing;

at least one RF ID tag reader, said at least one RF ID tag reader establishing communication with said at least one RF ID tag; said at least one RF ID tag reader including at least two electronically steerable scanning antennas; and

said at least one RF ID tag reader determining the relative location of said at least one RF ID tag by triangulating the angular information between said at least one RF ID tag and said at least two electronically steerable scanning antennas associated with said at least one RF ID tag reader.

74. The object, person or thing position determination system of claim 73, further comprising a means for determining the signal strength of the communication between said at least one RF ID tag and said at least one RF ID tag reader to improve accuracy of said position information.

76. The object, person or thing position determination system of claim 73, further comprising a means for determining the time of flight of RF signals between said at least one RF ID tag and said at least one RF ID tag reader to improve accuracy of said position information.

76. An object, person or thing position determination system, comprising:

at least one RF ID tag associated with said object, person or thing;

at least two RF ID tag readers, said at least two RF ID tag readers establishing communication with said at least one RF ID tag; said at least two RF ID tag readers including at least one electronically steerable scanning antenna; and

said at least two RF ID tag readers determining the relative location of said at least one RF ID tag by triangulating the angular information between said at least one RF ID tag and said at least one electronically steerable scanning antennas associated with said at least two RF ID tag readers.

77. The object, person or thing position determination system of claim 76, further comprising a means for determining the signal strength of the

communication between said at least one RF ID tag and said at least two RF ID tag readers to improve accuracy of said position information.

75. The object, person or thing position determination system of claim 76, further comprising a means for determining the time of flight of RF signals between said at least one RF ID tag and said at least two RF ID tag readers to improve accuracy of said position information.